



26 April 1962

Dear Sir:

Re: EG-400 Task VI

Transmitted herewith is informal Progress Report #5
as required by the contract.

E.L.G.

ELG/RDP/mak

Orig. + lcc J.P.
C.F.H.
W.R.E.
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E.D.P.

Per B Com

Progress Report #5
Stereo Projection Viewer for
One or Two Roll Form Prints

Summary

During the report period it has been established by further design that the use of a "double-dove prism" with a collimator lens would require a lens that was large in size and physically different for each magnification, rather than a simple airspace adjustment. Additional methods to provide the image rotation have been studied, with the result that the "Z-prism" image rotation element as described in the original proposal appears to provide the most compact design. This change of approach will require modified lens designs to account for the longer glass path.

Optical Design

As stated in Progress Report #4 the "collimator" lens used with the double dove prism has an inward curving field. The extent of this curvature is great enough so that, if used, it would require complete new designs for the main objective lens for each magnification. Another problem arose in the amount of spherical aberration in the collimator lens which produces image doubling at the screen from the two widely separated pupils of the double-dove prism.

Earlier in the program we had considered the use of the "Z-prism", but shelved it in favor of the double-dove prism with the expectation of being able to proceed with a minimum of optical design work. This has been found false and the indication is that a more direct design approach can be applied to a Z-prism system with the expectation of better projector performance than with the double-dove prism and collimator lens.

However, problems are still present in a Z-prism system and the major ones are listed below.

1. We must design special objective lenses to work with the great length of glass introduced into the optical path by the Z-prism.

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2. The Z-prisms must be made of high index glass (EDF-1, $n_D = 1.649$) to accommodate the necessary field angle in the projection system.
3. The usual supplies of EDF-1 glass are somewhat yellow, and with the 15 to 20 inches of optical path expected this may produce a definite yellow tone in the projected image. We will explore a West German source (Schott) who have recently offered several high index glasses with low "color index". The large pieces and low striae requirements will also complicate this problem.

A lens designer has been assigned to 7.5X lens and another to the 15X lens by the date of this report. We will either assign a third designer to the 30X lens or subcontract for its design.

Mechanical Design Studies

The change of optical design has not appreciably slowed our mechanical design work. Hopefully, we expect to have the Z-prism optical design established by the time the detail mechanical design around the lens and prism must be worked upon. Other design work is proceeding normally.

RDP/ELG/mak

R.D.P.